

## **APPENDIX I**

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### **WATER SERVICE SYSTEM ANALYSIS**

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## East Sunnyvale ITR Project

### Water System

This report provides a discussion of the existing water supply system relative to the East Sunnyvale ITR Project.

**Project Location.** The East Sunnyvale ITR project area is located in east Sunnyvale, generally bounded by Duane Avenue on the north, Stewart Avenue on the south, Wolfe Road / Fair Oaks Avenue on the west and Lawrence Expressway on the East. The Kings Academy High School, formerly Sunnyvale High School, and Fair Oaks Park are located on the west side of the project site. The nearest major thoroughfares are U.S. Highway 101, Bayshore Freeway, to the north, Central Expressway to the south, and Lawrence Expressway to the east.

**Land Use.** The project is currently zoned for industrial uses and is occupied by that type of use. The project plans to change the General Plan designation from Industrial to ITR, or Industrial-to Residential. The ITR designation allows for the continuation or expansion of existing industrial and commercial uses as well as the construction of new residential housing. Proposed residential conversion on this site includes R-3 medium density at 12 to 25 dwelling units per acre and R-4 high density residential development at 25 to 36 dwelling units per acre. Figure 1 shows the proposed Land Use Plan.

**Existing System.** The project site is served by the City of Sunnyvale municipal water system that provides domestic water and fire protection to the existing industrial uses. The existing distribution system consists of 10" pipes interconnected, or looped, within the existing street right-of ways of Duane Avenue, Stewart Drive, North Wolfe Road, De Guigne Drive and East Duane Avenue. These 10" pipes are supplied by and connected to the 16" line in Lawrence Expressway at Duane and East Duane Avenues, 10" lines in Santa Trinita Drive, De Guigne Drive and North Wolfe Road, 8" lines in Fair Oaks, Duane, San Juan, Santa Paula, San Rafael, San Simeon and Santa Ynez Avenues. Additionally, there are 6" connections to Duane Avenue at San Luisto, San Miguel, San Patricio and San Pedro Avenues, and there is a connection through a pressure reducing valve from the 30" line to the 10" pipe in Duane Avenue in the intersection of Duane and Britton Avenues at the northwest corner of the project site.

The City Department of Public Works has indicated that the existing system has a static pressure of 81 psi (pounds per square inch) near the intersection of Santa Trinita Avenue and Stewart Drive. Flow tests conducted at two hydrants in this vicinity produced flows of 1414 and 1443 gpm (gallons per minute) with a residual pressure of 78 psi.

**Proposed Project.** Proposed residential on this site ranges from a high density (R-4) of 25 to 36 dwelling units per acre to medium density (R-3) of 12 to 25 units per acre. It is anticipated that the site will be developed within the range of 1638 to 2842 units.

Assuming three (3) people per residential unit with a daily use of 75 gallons per day per person would result in a per capita use of 225 gallons/unit/day. For this analysis we used 3.3 people per dwelling unit or a rate of 250 gallons/unit/day for residential use.

The development of all 2842 residential units multiplied by 250 gallons/unit/day produces 710,500 gallons per day or 493 gpm. A peak flow factor of 2 produces a total demand of 986 gpm which is well within the existing systems operational range measured at 1400 gpm at a single point of delivery, and the development of the maximum number of 2842 units would not have an adverse impact on the existing water distribution system.

Retail use is based on 120 gallons/day/1000 sq.ft. for commercial/light industrial mixed-use development and 70 gallons/day/1000 sq.ft. for strictly retail use. We have assumed that the retail area will have a maximum floor area ratio (FAR) of 50%.

The retail area shown on Figure 1 occupies approximately 9.6 acres, or 417,600 sq. ft. Fifty percent of this area multiplied by 120 gallons per day divided by 1000 sq. ft. produces a demand of 25,056 gallons per day or 17.4 gpm, again, well within the existing distribution system's capacity.

The existing water distribution system was also evaluated in respect to its ability to provide water for fire protection. A fire flow demand of 2500 gpm from 2 or more hydrants was assumed for the base requirement. Discussions with the City Fire Department indicated that the Fire Department requires a minimum residual pressure of 20 psi when the flows are being extracted from the system.

The flow test information provided by the Public Works department at the hydrants located near the intersection of Stewart Drive and Santa Trinita Avenue of 1414 and 1443 gpm (gallons per minute) with a residual pressure of 78 psi meet this requirement.

To further evaluate the fire flow capacity of the existing distribution system we modeled the system using WaterCAD software by Bentley Systems, Inc. The existing pipe sizes, lengths and junctions were entered as shown on Figure 2. We chose 7 points of supply to the distribution system at existing points of connection along the easterly, southerly and westerly sides of the project area. The existing static pressure of 81 psi was used, converted to an equivalent elevation for these supply points identified as point numbers R-1 through R-7.

A flow of 2500 gpm was assumed at all 10 junction points labeled J-1 through J-10 simultaneously. The results of the analysis, shown on Table 1, show that the existing distribution system has the capacity to meet the assumed demand.

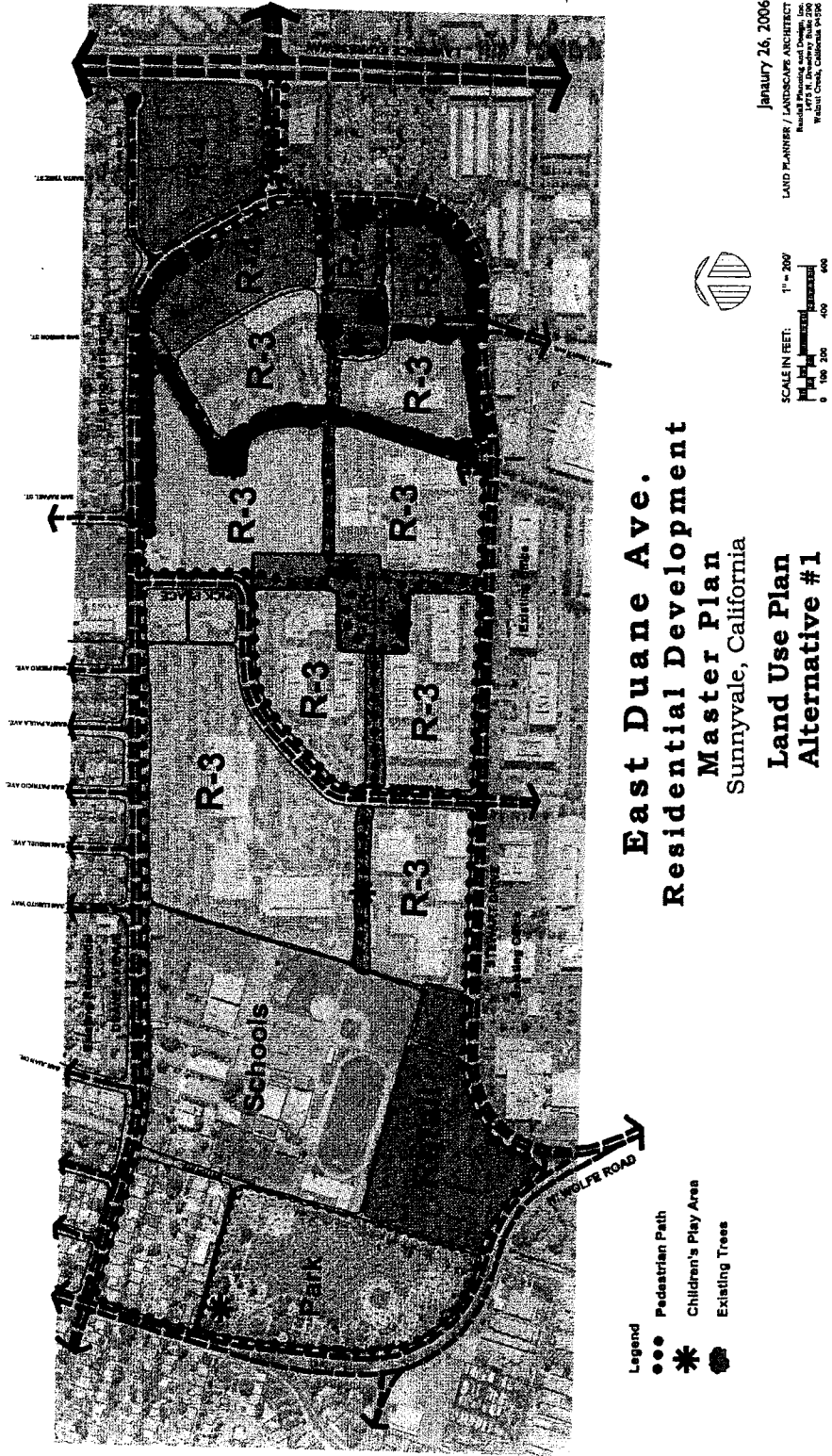


Figure 1: Proposed GPA Land Use Plan

Scenario: Base

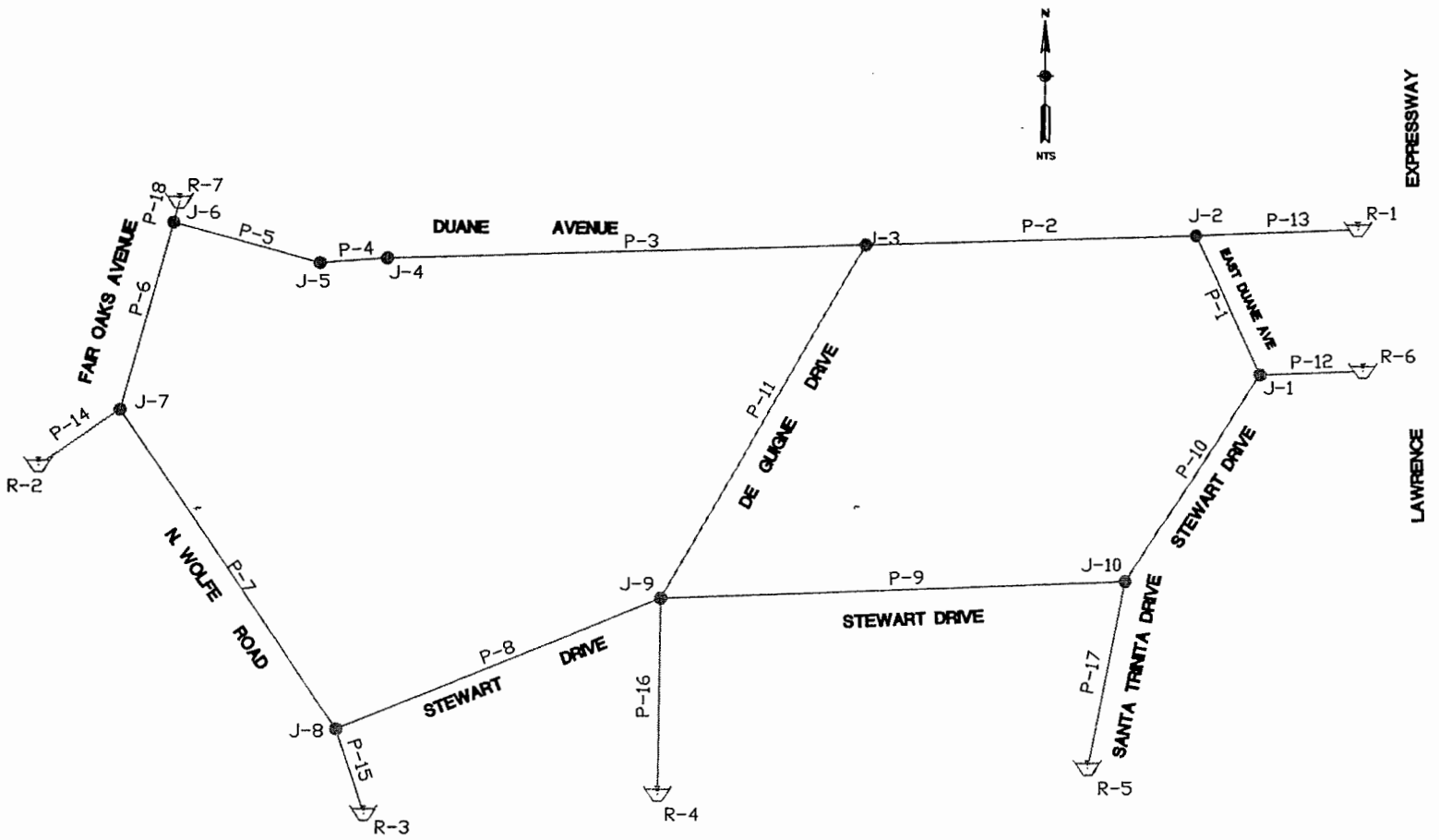


FIGURE 2:

Scenario: Base  
Fire Flow Analysis  
Fire Flow Report

Label	Zone	Fire Flow Iterations	Fire Flow Balanced?	Satisfies Fire Flow Constraints ?	Needed Fire Flow (gpm)	Available Fire Flow (gpm)	Total Flow Needed (gpm)	Total Flow Available (gpm)	Residual Pressure (psi)	Calculated Residual Pressure (psi)	Minimum Zone Pressure (psi)	Calculated Minimum Zone Pressure (psi)	Minimum Zone Junction	Minimum System Pressure (psi)	Calculated Minimum System Pressure (psi)	Minimum System Junction
J-1	Zone	2	true	true	2,500.000	5,000.000	2,522.830	5,022.830	20.00	71.03	20.00	78.33	J-2	20.00	78.33	J-2
J-2	Zone	2	true	true	2,500.000	5,000.000	2,559.288	5,059.288	20.00	71.47	20.00	75.32	J-3	20.00	75.32	J-3
J-3	Zone	2	true	true	2,500.000	5,000.000	2,645.313	5,145.313	20.00	57.76	20.00	64.86	J-4	20.00	64.86	J-4
J-4	Zone	2	true	true	2,500.000	5,000.000	2,517.778	5,017.778	20.00	32.36	20.00	38.14	J-5	20.00	38.14	J-5
J-5	Zone	2	true	true	2,500.000	5,000.000	2,503.299	5,003.298	20.00	30.66	20.00	38.48	J-4	20.00	38.48	J-4
J-6	Zone	2	true	true	2,500.000	5,000.000	2,503.472	5,003.472	20.00	69.15	20.00	74.83	J-5	20.00	74.83	J-5
J-7	Zone	2	true	true	2,500.000	5,000.000	2,500.000	5,000.000	20.00	58.32	20.00	78.13	J-8	20.00	78.13	J-8
J-8	Zone	2	true	true	2,500.000	5,000.000	2,699.314	5,199.314	20.00	67.81	20.00	78.19	J-7	20.00	78.19	J-7
J-9	Zone	2	true	true	2,500.000	5,000.000	2,653.472	5,153.473	20.00	68.02	20.00	77.88	J-3	20.00	77.88	J-3
J-10	Zone	2	true	true	2,500.000	5,000.000	2,536.458	5,036.458	20.00	64.68	20.00	78.65	J-1	20.00	78.65	J-1

TABLE 1

# Scenario: Base Fire Flow Analysis Reservoir Report

Label	Elevation (ft)	Zone	Inflow (gpm)	Calculated Hydraulic Grade (ft)
R-1	187.00	Zone	109.058	187.00
R-2	187.00	Zone	-40.827	187.00
R-3	187.00	Zone	158.795	187.00
R-4	187.00	Zone	107.515	187.00
R-5	187.00	Zone	-66.898	187.00
R-6	187.00	Zone	-83.386	187.00
R-7	187.00	Zone	-74.744	187.00

**Scenario: Base**  
**Fire Flow Analysis**  
**Fire Flow Report**

Label	Zone	Fire Flow Iterations	Fire Flow Balanced?	Satisfies Fire Flow Constraints?	Needed Fire Flow (gpm)	Available Fire Flow (gpm)	Total Flow Needed (gpm)	Total Flow Available (gpm)	Residual Pressure (psi)	Calculated Residual Pressure (psi)	Minimum Zone Pressure (psi)	Calculated Minimum Zone Pressure (psi)	Minimum Zone Junction
J-1	Zone	2	true	true	1,500.000	1,000.000	1,522.830	5,022.830	20.00	71.03	20.00	78.33	J-2
J-2	Zone	2	true	true	1,500.000	1,000.000	1,559.288	5,059.288	20.00	71.47	20.00	75.32	J-3
J-3	Zone	2	true	true	1,500.000	1,000.000	1,645.313	5,145.313	20.00	57.76	20.00	64.86	J-4
J-4	Zone	2	true	true	1,500.000	1,000.000	1,517.778	5,017.778	20.00	32.36	20.00	38.14	J-5
J-5	Zone	2	true	true	1,500.000	1,000.000	1,503.299	5,003.298	20.00	30.66	20.00	38.48	J-4
J-6	Zone	2	true	true	1,500.000	1,000.000	1,503.472	5,003.472	20.00	69.15	20.00	74.83	J-5
J-7	Zone	2	true	true	1,500.000	1,000.000	1,500.000	5,000.000	20.00	58.32	20.00	78.13	J-8
J-8	Zone	2	true	true	1,500.000	1,000.000	1,699.314	5,199.314	20.00	67.81	20.00	78.19	J-7
J-9	Zone	2	true	true	1,500.000	1,000.000	1,653.472	5,153.473	20.00	68.02	20.00	77.88	J-3
J-10	Zone	2	true	true	1,500.000	1,000.000	1,536.458	5,036.458	20.00	64.68	20.00	78.65	J-1



**Scenario: Base**  
**Fire Flow Analysis**  
**Fire Flow Report**

Minimum System Pressure (psi)	Calculated Minimum System Pressure (psi)	Minimum System Junction
20.00	78.33	J-2
20.00	75.32	J-3
20.00	64.86	J-4
20.00	38.14	J-5
20.00	38.48	J-4
20.00	74.83	J-5
20.00	78.13	J-8
20.00	78.19	J-7
20.00	77.88	J-3
20.00	78.65	J-1

**Scenario: Base  
Fire Flow Analysis  
Junction Report**

Label	Elevation (ft)	Zone	Type	Base Flow (gpm)	Pattern	Demand (gpm)	Calculated Hydraulic Grade (ft)	Pressure (psi)
J-1	0.00	Zone	Demand	22.830	Fixed	22.830	186.95	80.89
J-2	0.00	Zone	Demand	59.288	Fixed	59.288	186.93	80.88
J-3	0.00	Zone	Demand	145.312	Fixed	145.312	186.84	80.84
J-4	0.00	Zone	Demand	17.778	Fixed	17.778	186.86	80.85
J-5	0.00	Zone	Demand	3.299	Fixed	3.299	186.88	80.85
J-6	0.00	Zone	Demand	3.472	Fixed	3.472	186.98	80.90
J-7	0.00	Zone	Demand	0.000	Fixed	0.000	186.96	80.89
J-8	0.00	Zone	Demand	199.314	Fixed	199.314	186.86	80.85
J-9	0.00	Zone	Demand	153.472	Fixed	153.472	186.86	80.84
J-10	0.00	Zone	Demand	36.458	Fixed	36.458	186.94	80.88

## Detailed Report for Pressure Junction: J-1

### Scenario Summary

Scenario	Base
Active Topology Alternative	Base-Active Topology
Physical Alternative	Base-Physical
Demand Alternative	Base-Demand
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational
Age Alternative	Base-Age Alternative
Constituent Alternative	Base-Constituent
Trace Alternative	Base-Trace Alternative
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

### Global Adjustments Summary

<None>	Roughness	<None>
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### Geometric Summary

X	3,694.21 ft	Elevation	0.00 ft
Y	-9,385.50 ft	Zone	Zone

### Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	22.830	Fixed

### Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	186.95	80.89	186.95	22.830

## Detailed Report for Pressure Junction: J-2

### Scenario Summary

Scenario	Base
Active Topology Alternative	Base-Active Topology
Physical Alternative	Base-Physical
Demand Alternative	Base-Demand
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational
Age Alternative	Base-Age Alternative
Constituent Alternative	Base-Constituent
Trace Alternative	Base-Trace Alternative
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

### Global Adjustments Summary

<None>	Roughness	<None>
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### Geometric Summary

X	3,391.89 ft	Elevation	0.00 ft
Y	-8,743.46 ft	Zone	Zone

### Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	59.288	Fixed

### Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	186.93	80.88	186.93	59.288

## Detailed Report for Pressure Junction: J-3

### Scenario Summary

Scenario	Base
Active Topology Alternative	Base-Active Topology
Physical Alternative	Base-Physical
Demand Alternative	Base-Demand
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational
Age Alternative	Base-Age Alternative
Constituent Alternative	Base-Constituent
Trace Alternative	Base-Trace Alternative
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

### Global Adjustments Summary

<None>	Roughness	<None>
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### Geometric Summary

X	1,874.98 ft	Elevation	0.00 ft
Y	-8,782.06 ft	Zone	Zone

### Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	145.312	Fixed

### Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	186.84	80.84	186.84	145.312

## Detailed Report for Pressure Junction: J-4

### Scenario Summary

Scenario	Base
Active Topology Alternative	Base-Active Topology
Physical Alternative	Base-Physical
Demand Alternative	Base-Demand
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational
Age Alternative	Base-Age Alternative
Constituent Alternative	Base-Constituent
Trace Alternative	Base-Trace Alternative
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

### Global Adjustments Summary

<None>	Roughness	<None>
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### Geometric Summary

X	-337.60 ft	Elevation	0.00 ft
Y	-8,837.94 ft	Zone	Zone

### Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	17.778	Fixed

### Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	186.86	80.85	186.86	17.778

## Detailed Report for Pressure Junction: J-5

Scenario Summary	
Scenario	Base
Active Topology Alternative	Base-Active Topology
Physical Alternative	Base-Physical
Demand Alternative	Base-Demand
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational
Age Alternative	Base-Age Alternative
Constituent Alternative	Base-Constituent
Trace Alternative	Base-Trace Alternative
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary		
	<None>	Roughness
		<None>

Geometric Summary			
X	-646.28 ft	Elevation	0.00 ft
Y	-8,860.14 ft	Zone	Zone

Demand Summary		
Type	Base Flow (gpm)	Pattern
Demand	3.299	Fixed

Calculated Results Summary				
Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	186.88	80.85	186.88	3.299

## Detailed Report for Pressure Junction: J-6

Scenario Summary	
Scenario	Base
Active Topology Alternative	Base-Active Topology
Physical Alternative	Base-Physical
Demand Alternative	Base-Demand
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational
Age Alternative	Base-Age Alternative
Constituent Alternative	Base-Constituent
Trace Alternative	Base-Trace Alternative
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary		
	<None>	Roughness
		<None>

Geometric Summary			
X	-1,323.78 ft	Elevation	0.00 ft
Y	-8,672.72 ft	Zone	Zone

Demand Summary		
Type	Base Flow (gpm)	Pattern
Demand	3.472	Fixed

Calculated Results Summary				
Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	186.98	80.90	186.98	3.472



## Detailed Report for Pressure Junction: J-7

Scenario Summary	
Scenario	Base
Active Topology Alternative	Base-Active Topology
Physical Alternative	Base-Physical
Demand Alternative	Base-Demand
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational
Age Alternative	Base-Age Alternative
Constituent Alternative	Base-Constituent
Trace Alternative	Base-Trace Alternative
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
	<None>	Roughness	<None>

Geometric Summary			
X	-1,567.55 ft	Elevation	0.00 ft
Y	-9,532.89 ft	Zone	Zone

Demand Summary		
Type	Base Flow (gpm)	Pattern
Demand	0.000	Fixed

Calculated Results Summary				
Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	186.96	80.89	186.96	0.000

## Detailed Report for Pressure Junction: J-8

### Scenario Summary

Scenario	Base
Active Topology Alternative	Base-Active Topology
Physical Alternative	Base-Physical
Demand Alternative	Base-Demand
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational
Age Alternative	Base-Age Alternative
Constituent Alternative	Base-Constituent
Trace Alternative	Base-Trace Alternative
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

### Global Adjustments Summary

<None>	Roughness	<None>
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### Geometric Summary

X	-571.54 ft	Elevation	0.00 ft
Y	-10,998.87 ft	Zone	Zone

### Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	199.314	Fixed

### Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	186.86	80.85	186.86	199.314

## Detailed Report for Pressure Junction: J-9

### Scenario Summary

Scenario	Base
Active Topology Alternative	Base-Active Topology
Physical Alternative	Base-Physical
Demand Alternative	Base-Demand
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational
Age Alternative	Base-Age Alternative
Constituent Alternative	Base-Constituent
Trace Alternative	Base-Trace Alternative
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

### Global Adjustments Summary

<None>	Roughness	<None>
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### Geometric Summary

X	927.12 ft	Elevation	0.00 ft
Y	-10,403.95 ft	Zone	Zone

### Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	153.472	Fixed

### Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	186.86	80.84	186.86	153.472

## Detailed Report for Pressure Junction: J-10

Scenario Summary	
Scenario	Base
Active Topology Alternative	Base-Active Topology
Physical Alternative	Base-Physical
Demand Alternative	Base-Demand
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational
Age Alternative	Base-Age Alternative
Constituent Alternative	Base-Constituent
Trace Alternative	Base-Trace Alternative
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary		
	<None>	Roughness
		<None>

Geometric Summary			
X	3,069.34 ft	Elevation	0.00 ft
Y	-10,333.26 ft	Zone	Zone

Demand Summary		
Type	Base Flow (gpm)	Pattern
Demand	36.458	Fixed

Calculated Results Summary				
Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	186.94	80.88	186.94	36.458

## Detailed Report for Pressure Pipe: P-1

### Scenario Summary

Scenario	Base
Active Topology Alternative	Base-Active Topology
Physical Alternative	Base-Physical
Demand Alternative	Base-Demand
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational
Age Alternative	Base-Age Alternative
Constituent Alternative	Base-Constituent
Trace Alternative	Base-Trace Alternative
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

### Global Adjustments Summary

<None>	Roughness	<None>
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### Pipe Characteristics

Material	Cast iron	Hazen-Williams C	100.0
Diameter	10.0 in	Minor Loss Coefficient	0.00
Check Valve?	false	Length	725.00 ft
From Node	J-1	To Node	J-2

### Elevations

From Elevation	0.00 ft	To Elevation	0.00 ft
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### Initial Status

Initial Status	Open
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### Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	40.258	0.16	186.95	186.93	0.02	0.00	0.02	0.03

## Detailed Report for Pressure Pipe: P-2

### Scenario Summary

Scenario	Base
Active Topology Alternative	Base-Active Topology
Physical Alternative	Base-Physical
Demand Alternative	Base-Demand
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational
Age Alternative	Base-Age Alternative
Constituent Alternative	Base-Constituent
Trace Alternative	Base-Trace Alternative
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

### Global Adjustments Summary

<None>	Roughness	<None>
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### Pipe Characteristics

Material	Asbestos Cement	Hazen- Williams C	140.0
Diameter	10.0 in	Minor Loss Coefficient	0.00
Check Valve?	false	Length	1,517.00 ft
From Node	J-2	To Node	J-3

### Elevations

From Elevation	0.00 ft	To Elevation	0.00 ft
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### Initial Status

Initial Status	Open
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### Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	90.028	0.37	186.93	186.84	0.09	0.00	0.09	0.06

## Detailed Report for Pressure Pipe: P-3

Scenario Summary	
Scenario	Base
Active Topology Alternative	Base-Active Topology
Physical Alternative	Base-Physical
Demand Alternative	Base-Demand
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational
Age Alternative	Base-Age Alternative
Constituent Alternative	Base-Constituent
Trace Alternative	Base-Trace Alternative
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary		
	<None>	Roughness
		<None>

Pipe Characteristics			
Material	Asbestos Cement	Hazen- Williams C	140.0
Diameter	10.0 in	Minor Loss Coefficient	0.00
Check Valve?	false	Length	2,213.00 ft
From Node	J-3	To Node	J-4

Elevations			
From Elevation	0.00 ft	To Elevation	0.00 ft

Initial Status	
Initial Status	Open

Calculated Results Summary									
Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	-34.875	0.14	186.84	186.86	0.02	0.00	0.02	0.01

## Detailed Report for Pressure Pipe: P-4

Scenario Summary	
Scenario	Base
Active Topology Alternative	Base-Active Topology
Physical Alternative	Base-Physical
Demand Alternative	Base-Demand
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational
Age Alternative	Base-Age Alternative
Constituent Alternative	Base-Constituent
Trace Alternative	Base-Trace Alternative
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary		
	<None>	Roughness
		<None>

Pipe Characteristics			
Material	Cast iron	Hazen- Williams C	100.0
Diameter	10.0 in	Minor Loss Coefficient	0.00
Check Valve?	false	Length	309.00 ft
From Node	J-4	To Node	J-5

Elevations			
From Elevation	0.00 ft	To Elevation	0.00 ft

Initial Status	
Initial Status	Open

Calculated Results Summary									
Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	-52.653	0.22	186.86	186.88	0.01	0.00	0.01	0.04



## Detailed Report for Pressure Pipe: P-5

### Scenario Summary

Scenario	Base
Active Topology Alternative	Base-Active Topology
Physical Alternative	Base-Physical
Demand Alternative	Base-Demand
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational
Age Alternative	Base-Age Alternative
Constituent Alternative	Base-Constituent
Trace Alternative	Base-Trace Alternative
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

### Global Adjustments Summary

<None>	Roughness	<None>
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### Pipe Characteristics

Material	Ductile Iron	Hazen- Williams C	100.0
Diameter	8.0 in	Minor Loss Coefficient	0.00
Check Valve?	false	Length	703.00 ft
From Node	J-5	To Node	J-6

### Elevations

From Elevation	0.00 ft	To Elevation	0.00 ft
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### Initial Status

Initial Status	Open
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### Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	-55.952	0.36	186.88	186.98	0.10	0.00	0.10	0.14

## Detailed Report for Pressure Pipe: P-6

Scenario Summary									
Scenario		Base							
Active Topology Alternative		Base-Active Topology							
Physical Alternative		Base-Physical							
Demand Alternative		Base-Demand							
Initial Settings Alternative		Base-Initial Settings							
Operational Alternative		Base-Operational							
Age Alternative		Base-Age Alternative							
Constituent Alternative		Base-Constituent							
Trace Alternative		Base-Trace Alternative							
Fire Flow Alternative		Base-Fire Flow							
Capital Cost Alternative		Base-Capital Cost							
Energy Cost Alternative		Base-Energy Cost							
User Data Alternative		Base-User Data							
Global Adjustments Summary									
		<None>		Roughness		<None>			
Pipe Characteristics									
Material		Cast iron		Hazen- Williams C		100.0			
Diameter		8.0 in		Minor Loss Coefficient		0.00			
Check Valve?		false		Length		894.00 ft			
From Node		J-6		To Node		J-7			
Elevations									
From Elevation		0.00 ft		To Elevation		0.00 ft			
Initial Status									
Initial Status		Open							
Calculated Results Summary									
Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	15.320	0.10	186.98	186.96	0.01	0.00	0.01	0.01

## Detailed Report for Pressure Pipe: P-7

### Scenario Summary

Scenario	Base
Active Topology Alternative	Base-Active Topology
Physical Alternative	Base-Physical
Demand Alternative	Base-Demand
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational
Age Alternative	Base-Age Alternative
Constituent Alternative	Base-Constituent
Trace Alternative	Base-Trace Alternative
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

### Global Adjustments Summary

<None>	Roughness	<None>
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### Pipe Characteristics

Material	Cast iron	Hazen- Williams C	100.0
Diameter	10.0 in	Minor Loss Coefficient	0.00
Check Valve?	false	Length	2,062.00 ft
From Node	J-7	To Node	J-8

### Elevations

From Elevation	0.00 ft	To Elevation	0.00 ft
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### Initial Status

Initial Status	Open
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### Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	56.148	0.23	186.96	186.86	0.10	0.00	0.10	0.05

## Detailed Report for Pressure Pipe: P-8

Scenario Summary	
Scenario	Base
Active Topology Alternative	Base-Active Topology
Physical Alternative	Base-Physical
Demand Alternative	Base-Demand
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational
Age Alternative	Base-Age Alternative
Constituent Alternative	Base-Constituent
Trace Alternative	Base-Trace Alternative
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary		
	<None>	Roughness
		<None>

Pipe Characteristics			
Material	Cast iron	Hazen- Williams C	100.0
Diameter	10.0 in	Minor Loss Coefficient	0.00
Check Valve?	false	Length	1,951.00 ft
From Node	J-8	To Node	J-9

Elevations			
From Elevation	0.00 ft	To Elevation	0.00 ft

Initial Status	
Initial Status	Open

Calculated Results Summary									
Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	15.629	0.06	186.86	186.86	0.01	0.00	0.01	0.00

## Detailed Report for Pressure Pipe: P-9

Scenario Summary	
Scenario	Base
Active Topology Alternative	Base-Active Topology
Physical Alternative	Base-Physical
Demand Alternative	Base-Demand
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational
Age Alternative	Base-Age Alternative
Constituent Alternative	Base-Constituent
Trace Alternative	Base-Trace Alternative
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary		
	<None>	Roughness
		<None>

Pipe Characteristics			
Material	Cast iron	Hazen- Williams C	100.0
Diameter	10.0 in	Minor Loss Coefficient	0.00
Check Valve?	false	Length	2,149.00 ft
From Node	J-9	To Node	J-10

Elevations			
From Elevation	0.00 ft	To Elevation	0.00 ft

Initial Status	
Initial Status	Open

Calculated Results Summary									
Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	-50.738	0.21	186.86	186.94	0.09	0.00	0.09	0.04

## Detailed Report for Pressure Pipe: P-10

Scenario Summary	
Scenario	Base
Active Topology Alternative	Base-Active Topology
Physical Alternative	Base-Physical
Demand Alternative	Base-Demand
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational
Age Alternative	Base-Age Alternative
Constituent Alternative	Base-Constituent
Trace Alternative	Base-Trace Alternative
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary		
	<None>	Roughness
		<None>

Pipe Characteristics			
Material	Cast iron	Hazen- Williams C	100.0
Diameter	10.0 in	Minor Loss Coefficient	0.00
Check Valve?	false	Length	1,367.00 ft
From Node	J-10	To Node	J-1

Elevations			
From Elevation	0.00 ft	To Elevation	0.00 ft

Initial Status	
Initial Status	Open

Calculated Results Summary									
Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	-20.298	0.08	186.94	186.95	0.01	0.00	0.01	0.01

## Detailed Report for Pressure Pipe: P-11

Scenario Summary	
Scenario	Base
Active Topology Alternative	Base-Active Topology
Physical Alternative	Base-Physical
Demand Alternative	Base-Demand
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational
Age Alternative	Base-Age Alternative
Constituent Alternative	Base-Constituent
Trace Alternative	Base-Trace Alternative
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
	<None>	Roughness	<None>

Pipe Characteristics			
Material	Cast iron	Hazen- Williams C	100.0
Diameter	10.0 in	Minor Loss Coefficient	0.00
Check Valve?	false	Length	2,299.00 ft
From Node	J-3	To Node	J-9

Elevations			
From Elevation	0.00 ft	To Elevation	0.00 ft

Initial Status	
Initial Status	Open

Calculated Results Summary									
Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	-20.409	0.08	186.84	186.86	0.02	0.00	0.02	0.01

## Detailed Report for Pressure Pipe: P-12

Scenario Summary	
Scenario	Base
Active Topology Alternative	Base-Active Topology
Physical Alternative	Base-Physical
Demand Alternative	Base-Demand
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational
Age Alternative	Base-Age Alternative
Constituent Alternative	Base-Constituent
Trace Alternative	Base-Trace Alternative
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary		
	<None>	Roughness
		<None>

Pipe Characteristics			
Material	Cast iron	Hazen- Williams C	100.0
Diameter	10.0 in	Minor Loss Coefficient	0.00
Check Valve?	false	Length	480.00 ft
From Node	R-6	To Node	J-1

Elevations			
From Elevation	187.00 ft	To Elevation	0.00 ft

Initial Status	
Initial Status	Open

Calculated Results Summary									
Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	83.386	0.34	187.00	186.95	0.05	0.00	0.05	0.10



## Detailed Report for Pressure Pipe: P-13

Scenario Summary	
Scenario	Base
Active Topology Alternative	Base-Active Topology
Physical Alternative	Base-Physical
Demand Alternative	Base-Demand
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational
Age Alternative	Base-Age Alternative
Constituent Alternative	Base-Constituent
Trace Alternative	Base-Trace Alternative
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary		
	<None>	Roughness
		<None>

Pipe Characteristics			
Material	Asbestos Cement	Hazen- Williams C	140.0
Diameter	10.0 in	Minor Loss Coefficient	0.00
Check Valve?	false	Length	758.00 ft
From Node	R-1	To Node	J-2

Elevations			
From Elevation	187.00 ft	To Elevation	0.00 ft

Initial Status	
Initial Status	Open

Calculated Results Summary										
Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)	
0.00	Open	109.058	0.45	187.00	186.93	0.07	0.00	0.07	0.09	

## Detailed Report for Pressure Pipe: P-14

Scenario Summary	
Scenario	Base
Active Topology Alternative	Base-Active Topology
Physical Alternative	Base-Physical
Demand Alternative	Base-Demand
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational
Age Alternative	Base-Age Alternative
Constituent Alternative	Base-Constituent
Trace Alternative	Base-Trace Alternative
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary		
	<None>	Roughness
		<None>

Pipe Characteristics			
Material	Cast iron	Hazen- Williams C	100.0
Diameter	8.0 in	Minor Loss Coefficient	0.00
Check Valve?	false	Length	452.00 ft
From Node	R-2	To Node	J-7

Elevations			
From Elevation	187.00 ft	To Elevation	0.00 ft

Initial Status	
Initial Status	Open

Calculated Results Summary									
Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	40.827	0.26	187.00	186.96	0.04	0.00	0.04	0.08

## Detailed Report for Pressure Pipe: P-15

Scenario Summary	
Scenario	Base
Active Topology Alternative	Base-Active Topology
Physical Alternative	Base-Physical
Demand Alternative	Base-Demand
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational
Age Alternative	Base-Age Alternative
Constituent Alternative	Base-Constituent
Trace Alternative	Base-Trace Alternative
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary		
	<None>	Roughness
		<None>

Pipe Characteristics			
Material	Cast iron	Hazen- Williams C	100.0
Diameter	10.0 in	Minor Loss Coefficient	0.00
Check Valve?	false	Length	409.00 ft
From Node	R-3	To Node	J-8

Elevations			
From Elevation	187.00 ft	To Elevation	0.00 ft

Initial Status	
Initial Status	Open

Calculated Results Summary									
Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	158.795	0.65	187.00	186.86	0.14	0.00	0.14	0.33

## Detailed Report for Pressure Pipe: P-16

Scenario Summary	
Scenario	Base
Active Topology Alternative	Base-Active Topology
Physical Alternative	Base-Physical
Demand Alternative	Base-Demand
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational
Age Alternative	Base-Age Alternative
Constituent Alternative	Base-Constituent
Trace Alternative	Base-Trace Alternative
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary		
	<None>	Roughness
		<None>

Pipe Characteristics			
Material	Cast iron	Hazen- Williams C	100.0
Diameter	10.0 in	Minor Loss Coefficient	0.00
Check Valve?	false	Length	897.00 ft
From Node	R-4	To Node	J-9

Elevations			
From Elevation	187.00 ft	To Elevation	0.00 ft

Initial Status	
Initial Status	Open

Calculated Results Summary									
Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	107.515	0.44	187.00	186.86	0.14	0.00	0.14	0.16

## Detailed Report for Pressure Pipe: P-17

Scenario Summary	
Scenario	Base
Active Topology Alternative	Base-Active Topology
Physical Alternative	Base-Physical
Demand Alternative	Base-Demand
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational
Age Alternative	Base-Age Alternative
Constituent Alternative	Base-Constituent
Trace Alternative	Base-Trace Alternative
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary		
	<None>	Roughness
		<None>

Pipe Characteristics			
Material	Cast iron	Hazen- Williams C	100.0
Diameter	10.0 in	Minor Loss Coefficient	0.00
Check Valve?	false	Length	872.00 ft
From Node	R-5	To Node	J-10

Elevations			
From Elevation	187.00 ft	To Elevation	0.00 ft

Initial Status	
Initial Status	Open

Calculated Results Summary										
Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)	
0.00	Open	66.898	0.27	187.00	186.94	0.06	0.00	0.06	0.07	

## Detailed Report for Pressure Pipe: P-18

Scenario Summary	
Scenario	Base
Active Topology Alternative	Base-Active Topology
Physical Alternative	Base-Physical
Demand Alternative	Base-Demand
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational
Age Alternative	Base-Age Alternative
Constituent Alternative	Base-Constituent
Trace Alternative	Base-Trace Alternative
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary		
	<None>	Roughness
		<None>

Pipe Characteristics			
Material	Cast iron	Hazen- Williams C	100.0
Diameter	8.0 in	Minor Loss Coefficient	0.00
Check Valve?	false	Length	100.00 ft
From Node	R-7	To Node	J-6

Elevations			
From Elevation	187.00 ft	To Elevation	0.00 ft

Initial Status	
Initial Status	Open

Calculated Results Summary									
Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	74.744	0.48	187.00	186.98	0.02	0.00	0.02	0.24

## Detailed Report for Reservoir: R-1

### Scenario Summary

Scenario	Base
Active Topology Alternative	Base-Active Topology
Physical Alternative	Base-Physical
Demand Alternative	Base-Demand
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational
Age Alternative	Base-Age Alternative
Constituent Alternative	Base-Constituent
Trace Alternative	Base-Trace Alternative
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

### Global Adjustments Summary

<None>	Roughness	<None>
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### Geometric Summary

X	4,149.66 ft	Elevation	187.00 ft
Y	-8,717.82 ft	Zone	Zone

### Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Inflow (gpm)	Outflow (gpm)
0.00	187.00	-109.058	109.058

## Detailed Report for Reservoir: R-2

### Scenario Summary

Scenario	Base
Active Topology Alternative	Base-Active Topology
Physical Alternative	Base-Physical
Demand Alternative	Base-Demand
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational
Age Alternative	Base-Age Alternative
Constituent Alternative	Base-Constituent
Trace Alternative	Base-Trace Alternative
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

### Global Adjustments Summary

<None>	Roughness	<None>
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### Geometric Summary

X	-1,940.45 ft	Elevation	187.00 ft
Y	-9,788.29 ft	Zone	Zone

### Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Inflow (gpm)	Outflow (gpm)
0.00	187.00	-40.827	40.827



## Detailed Report for Reservoir: R-3

### Scenario Summary

Scenario	Base
Active Topology Alternative	Base-Active Topology
Physical Alternative	Base-Physical
Demand Alternative	Base-Demand
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational
Age Alternative	Base-Age Alternative
Constituent Alternative	Base-Constituent
Trace Alternative	Base-Trace Alternative
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

### Global Adjustments Summary

<None>	Roughness	<None>
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### Geometric Summary

X	-444.00 ft	Elevation	187.00 ft
Y	-11,385.00 ft	Zone	Zone

### Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Inflow (gpm)	Outflow (gpm)
0.00	187.00	-158.795	158.795

## Detailed Report for Reservoir: R-4

### Scenario Summary

Scenario	Base
Active Topology Alternative	Base-Active Topology
Physical Alternative	Base-Physical
Demand Alternative	Base-Demand
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational
Age Alternative	Base-Age Alternative
Constituent Alternative	Base-Constituent
Trace Alternative	Base-Trace Alternative
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

### Global Adjustments Summary

<None>	Roughness	<None>
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### Geometric Summary

X	911.79 ft	Elevation	187.00 ft
Y	-11,300.89 ft	Zone	Zone

### Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Inflow (gpm)	Outflow (gpm)
0.00	187.00	-107.515	107.515

## Detailed Report for Reservoir: R-5

Scenario Summary	
Scenario	Base
Active Topology Alternative	Base-Active Topology
Physical Alternative	Base-Physical
Demand Alternative	Base-Demand
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational
Age Alternative	Base-Age Alternative
Constituent Alternative	Base-Constituent
Trace Alternative	Base-Trace Alternative
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary		
	<None>	Roughness
		<None>

Geometric Summary			
X	2,896.28 ft	Elevation	187.00 ft
Y	-11,185.56 ft	Zone	Zone

Calculated Results Summary				
Time (hr)	Calculated Hydraulic Grade (ft)	Inflow (gpm)	Outflow (gpm)	
0.00	187.00	-66.898	66.898	

## Detailed Report for Reservoir: R-6

Scenario Summary	
Scenario	Base
Active Topology Alternative	Base-Active Topology
Physical Alternative	Base-Physical
Demand Alternative	Base-Demand
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational
Age Alternative	Base-Age Alternative
Constituent Alternative	Base-Constituent
Trace Alternative	Base-Trace Alternative
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
	<None>	Roughness	<None>

Geometric Summary			
X	4,173.82 ft	Elevation	187.00 ft
Y	-9,371.32 ft	Zone	Zone

Calculated Results Summary				
Time (hr)	Calculated Hydraulic Grade (ft)	Inflow (gpm)	Outflow (gpm)	
0.00	187.00	-83.386	83.386	

## Detailed Report for Reservoir: R-7

### Scenario Summary

Scenario	Base
Active Topology Alternative	Base-Active Topology
Physical Alternative	Base-Physical
Demand Alternative	Base-Demand
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational
Age Alternative	Base-Age Alternative
Constituent Alternative	Base-Constituent
Trace Alternative	Base-Trace Alternative
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

### Global Adjustments Summary

<None>	Roughness	<None>
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### Geometric Summary

X	-1,297.18 ft	Elevation	187.00 ft
Y	-8,576.33 ft	Zone	Zone

### Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Inflow (gpm)	Outflow (gpm)
0.00	187.00	-74.744	74.744